Hazardous Waste Section

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General (G)	Permit (P)	Corrective Action (A)
☐ Notification 8700 (8700) ☐ Hazardous Waste Report (HWR) ☐ Fees/Invoices (F) ☐ Technical Assistance (TA) ☐ Compliance Assistance Visit (CAV) ☐ Correspondence (C) ☐ Other (O)	☐ Part A Application (PA) ☐ Part B Application (PB) ☐ Notice of Deficiency (NOD) ☐ Permitting Information (PI) ☐ Alternative to Post-Closure Permit (APC) ☐ Modification (MOD) ☐ Correspondence (C) ☐ Other (O)	☐ Corrective Action Information (CAI) ☐ RCRA Facility Assessment (RFA) ☐ Confirmatory Sampling (CS) ☐ RCRA Facility Investigation (RFI) ☐ Interim Measures Study/Plan/Implemented (IM) ☐ Corrective Measure Plan/Design (CMP) ☐ Land Use Restriction, Institutional Controls (LUR) ☐ Remediation System Effective Reports (RSER) ☐ Corrective Measures Study (CMS) ☐ HSWA Remedy (HSWA) ☐ Environmental Indicators (EI) ☐ Correspondence (C) ☐ Other (O)
Closure (C)	**Groundwater (W)**	
☐ Closure Information (CI) ☐ Closure Plan (CP) ☐ Closure Report/Certification (CR) ☐ Correspondence (C) ☐ Other (O)	☐ Groundwater Monitoring Report (GMR) ☐ Comprehensive Monitoring Event (CME) ☐ Correspondence (C) ☐ Other (O)	
Financial (F)	**Inspection/Investigation (I)**	**Enforcement (E)**
☐ Financial Record Review (FRR) ☐ Mechanisms and instruments (MI) ☐ Financial statements (FS) ☐ Balance sheets (BS) ☐ Tax returns (TR) ☐ Insurances (I) ☐ Correspondence (C) ☐ Other (O)	☐ Complaint Investigation (CMP) ☐ Compliance Evaluation Inspection (CEI) ☐ Case Development Inspections (CDI) ☐ Compliance Schedule Evaluation (CSE) ☐ Focused Compliance Inspection (FCI) ☐ Sampling Event (SPL) ☐ Emergency Response (EMR) ☐ Correspondence (C) ☐ Other (O)	☐ Ticket Notice of Violation (TNOV) ☐ Notice of Violation (NOV) ☐ Immediate Action Notice of Violation (IANOV) ☐ Enforcement Package (EP) ☐ Compliance Order (CO) ☐ Administrative Order on Consent (AOC) ☐ Settlement Agreement (SA) ☐ Correspondence (C) ☐ Other (O)
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September 2010 Refinements to Existing Remediation Strategy

IV. Date of Document: *Date when the document generated, the date typed or printed on the front page of document*

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ENVIRONMENTAL

Mr. Mark Wilkins
Hydrogeologist
North Carolina Department Environment and Natural Resources
Hazardous Waste Section
401 Oberlin Rd.
Raleigh, North Carolina 27610

Subject:

Proposed Refinements to the Existing Remedial Strategy, Former Ashland Inc. Facility, 2802 Patterson Street, Greensboro, North Carolina, EPA ID#: NCD 024 599 011

Date:
September 30, 2010

Contact:
Donald R. Malone, PE

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919.854.1282

Email:
donald.malone@arcadis-us.com

Our ref:
OH03000.NC03

ARCADIS G&M of North Carolina, Inc.

NC Engineering License # C-1869
NC Surveying License # C-1869

Dear Mark:

This letter is a follow up to ARCADIS' correspondence dated July 23, 2010, and presents the remedial strategy development process currently being employed for the Former Ashland Inc. Chemical Distribution Facility in Greensboro, North Carolina (**Figures 1 and 2**). This process involves a multi-Task approach for developing a remedial strategy and the final remedial approach as follows:

- **Task 1.** Investigate the extent of chemical impacts to environmental media;
- **Task 2.** Assess whether the chemicals of potential concern (COPCs) concentrations pose potential risks to human and/or ecological exposure points;
- **Task 3.** Determine whether interim measures are required to reduce COPC concentrations and potential risks identified in Task 2; and
- **Task 4.** Evaluate corrective measure alternatives (CMAs) capable of reducing COPC impacts in soil and groundwater to applicable regulatory thresholds.

The status of each Task is discussed in more detail below.

Task 1. Investigate the Extent of Chemical Impacts to Environmental Media

Summary of Historical Investigations Conducted at the Site

Environmental investigations were initiated at the Site by T.M. Gates in November 4, 1987, with a Hydrogeologic Investigation Work Plan submitted to the North Carolina Department of Natural Resources and Community Development (NCDNRCD). Site investigations were subsequently initiated in February 1988. A Hydrogeologic Investigation Report was prepared by T.M. Gates, and submitted to NCDNRCD on

March 30, 1988. Several additional investigations and assessments have been conducted since that time and reported within the following documents:

- Hydrogeologic Investigation Report (T.M. Gates – March 30, 1988).
- Subsurface Investigation (Sirrine Environmental Consultants – June 1992).
- Soil and Groundwater Assessment Report (Rust Environment and Infrastructure - 1993).
- Groundwater Assessment Report (Woodward-Clyde Consultants, Inc. - 1995).
- Phase II Groundwater Assessment (Environmental Strategies Corporation [ECS] - 1999).
- Site Conceptual Model and Revised Phase II Assessment Work Plan (Environmental Strategies Corporation -October 18, 2000).
- Phase II Soil Assessment (URS Corporation - 2002).
- Phase III Source Zone Contamination Delineation (ARCADIS - July 15, 2009)
- Vapor Intrusion Assessment Work Plan (ARCADIS – March 8, 2010)
- Work Plan for Soil Gas Survey Near a Small Tributary to South Buffalo Creek (ARCADIS – July 8, 2010)
- Surface Water and Near-Stream Groundwater Sampling Report (ARCADIS – July 19, 2010).
- Numerous groundwater monitoring events have been conducted at the Site since December 1994 by several consultants and at various frequencies.

Together, these documents are the equivalent of an initial Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) for the Site. The information contained within these reports is extensive; however, it is recognized that the information is dispersed across multiple reports. On this basis, ARCADIS proposes that all historical data and the proposed new supplemental investigation data be integrated into a single report for the Site. This report likely will be a final Phase III RFI Report for the facility. This report will aid the project Team's understanding of the Site conditions, and will enable NCDENR during evaluation of subsequent Interim Measures and/or Corrective Measures to be evaluated for the Site.

Additional Subsurface Investigations Proposed for 2010 and 2011

ARCADIS initiated additional subsurface investigations during July 2010 by submittal of the soil gas survey work plan to assess the horizontal and vertical extent of COPCs impacts to soil and groundwater below the Site, and below adjacent and/or downgradient properties. A summary of the planned and/or ongoing investigations are presented below.

Soil Gas Survey Conducted in August 2010

Based on the ARCADIS' file reviews conducted in 2009 and 2010 at various NCDENR offices, other potential industrial sources of the COPCs have been identified in the vicinity of the Site (**Figure 1**) including:

- ECOFLO® Inc. (ECOFLO®) located at 2750 Patterson Street,
- Hazardous Substance Disposal Site (HSDS) located at 3880 Immanuel Road,
- Sunset Dry Cleaners located at 2615 Highpoint Road,
- 1-Hour Martinizing located at 2519 Highpoint Road,
- Flint Ink located at 2805 Patterson Street,
- Dow Corning Corp. (Dow) located at 2914 Patterson Street,
- NC DOT Site#61 at the Norfolk Southern rail yard at 1124 S. Holden Road,
- Chemicals and Solvents, Inc. (Chemsolv) located at 2804 Patterson Street,
- Sherwin Williams located at 1025 Howard Street.
- Vertellus (Former Morflex Chemical Co./Pfiezer) located at 2110 High Point Road

ARCADIS submitted a work plan to North Carolina Department on Environment and Natural Resources (NCDENR) – Hazardous Waste Section (HWS) dated July 8, 2010 for investigating soil gas concentrations in the vicinity of the Site as a means of assessing the potential extent of soil and groundwater impacts, the possible effects of other (non-Ashland) sources and the potential locations for future groundwater monitoring wells. The work plan also contained a summary of chemical releases and results from environmental investigations conducted at these adjacent facilities, and proposed the collection of approximately 45 soil gas monitoring points utilizing Gore™ Modules. Additional information for the Gore™ Modules can be found at the following internet site (http://www.gore.com/en_xx/products/geochemical /petroleum/surveys_petroleum_fieldwork.html). Field deployment and retrieval of the Gore™ Modules occurred in late August 2010 and early September 2010, respectively. Preliminary results from the soil-gas investigations are provided in Attachment A.

A brief summary of the primary findings from Gore™ Module survey include:

- Tetrachloroethene (PCE) – The highest PCE concentrations (>2,000 µg/m$^{3)}$ in soil gas were detected along the south side of Johnston Properties and the former Ashland Site. In addition, high (>1,000 µg/m^3) PCE concentrations were also detected around the 1-Hour Martinizing facility, and moderate concentrations (>100 µg/m$^{3)}$ were detected south of Flink Ink.
- Trichloroethene (TCE) – The highest TCE concentrations (2,700 µg/m^3) were detected near the front and southeast of the former Ashland facility. Elevated TCE (up to 9 µg/m^3) was also detected northeast of the ECOFLO® facility. The detection north-east of the ECOFLO® site is consistent with the historical investigations on this site, which show TCE concentrations being significantly higher on the north-east side of the ECOFLO® site (well B-1), than in well B-4 located to the northwest of their facility and nearest to Ashland's former facility. These data suggest that another source (other than the Ashland site) may exist at, adjacent to or upgradient (north) of the ECOFLO® site.
- Cis-1,2-dichloroethene (cis-1,2-DCE) – Similar trends exist for cis-1,2-DCE as TCE, with the highest concentrations detected near the front and southeast of the former Ashland facility.
- 1,4-Dichlorobenzene (1,4-DCB) – Neither 1,4-DCB nor the other isomers (1,2-dichlorobenzene or 1,3-dichlorobenzene) were detected at elevated concentrations in the vicinity of the former Ashland facility. This is consistent with historical operations at the Site where these compounds were not stored or distributed in bulk from the facility. Elevated concentrations of DCB isomers (up to 46 µg/m$^{3)}$ have been detected at one location south of Flint Ink, two locations at the former Sherwin Williams plant located north of the Ashland facility along Oakland Avenue, and below properties southeast of the tributary to S. Buffalo Creek. These data suggest that multiple sources of 1,4-DCB (other than Ashland) may be present in the area and are the likely sources of impacts, with the impacts adjacent to S. Buffalo Creek of particular concern due to the proximity of residences. On the basis of the data collected to date, these impacts likely are not attributed to operations at the Ashland site.
- Total Petroleum Hydrocarbons (TPH) – Multiple potential sources of TPH exist in the study area, with the highest detections south of Flint Ink, and south of the tributary to S. Buffalo Creek. Given the limited specificity of the TPH methods, it is uncertain whether the TPH detections are petroleum related hydrocarbon compounds, the volatile compounds detected (for example 1,4-DCB) by the other analytical techniques, and/or naturally occurring compounds (e.g., turpenes) identified in some of the samples (Attachment A). .

The Gore™ Module data provided herein is considered to be preliminary, and additional information will be provided to the NCDENR–HWS in a Phase III RFI Addendum, which will be prepared upon completion of the subsurface investigations presented in this report.

Installation of Soil-Gas Monitor Points along Unnamed Tributary to S. Buffalo Creek

On the basis of the passive soil gas sampling results, ARCADIS is proposing to install three soil gas monitor locations near the unnamed tributary to S. Buffalo Creek to assess the potential for vapor intrusion in this area of the site. The potential locations for these points have not yet been determined, but will likely focus on areas identified by the Gore™ Module investigation to have detections of concentrations of total petroleum hydrocarbons; 1,4-dichlorobenzene; and PCE. These constituents are not necessarily the responsibility of Ashland because, as previously discussed, multiple potential source(s) of these chemicals have been identified in the study area.

VI Assessment on Johnston Properties Parcel

ARCADIS prepared and submitted to NCDENR a Vapor Intrusion Assessment Work Plan dated March 8, 2010 for the Johnston Properties parcel located at 2800 Patterson Street, immediately east of the former Ashland terminal. The field activities for the vapor intrusion assessment are currently planned for September 23rd and 24th, 2010. This work was initially planned for June 2010, but was postponed because the lease agreement for Johnston Properties' tenant, Dow Corning, was going to expire in the near future, and; therefore, the work was planned to be performed after Dow Corning vacated the building to minimize potential interferences from Dow Corning's operations and chemical storage practices. Data obtained from this investigation will be used within Task 2 of the remedial strategy development process, discussed below, to assess whether COPC concentrations in indoor vapor pose potential risks to future workers within the Johnston Properties' building.

Multi-Phase Source Investigation using MIPs/CPT

Ashland and ARCADIS are finalizing a work plan to investigate the extent of subsurface impacts below Ashland's former property, and adjacent properties including the former Lindley Estate (now owned by Ashland), Johnston Properties, Chemicals and Solvents Inc. (property now owned by George Cranford), and ATCO Rubber Products (**Figure 2**). The activities proposed in the work plan include the use of a drill rig equipped with direct-push technology (DPT) and a combination of down-hole tools including a Membrane-Interface Probe (MIPs), Cone-Penetrometer Test (CPT), and a Macro-Core® soil sampler. The purpose of this work is to define with better certainty the vertical and lateral distribution of impacts, and vertical and lateral mechanisms of transport and attenuation of target COPCs in the subsurface. These data will allow Ashland and ARCADIS to assess the fate and transport of COPC's at and down-gradient of the Site, the ongoing contributions of soil impacts to shallow and bedrock groundwater quality, the potential risks posed by Site and off-site sources of impact to human and/or ecological receptors (Task 2), possible options for interim measures (Task 3), and to facilitate the screening and selection of long-term remedial options (Task 4). A work plan will be submitted to NCDENR for review in late September 2010, and will include a detailed description of each phase of the source investigations proposed for the Site.

Installation of Additional Monitor Wells

After completing the multi-phase source investigations discussed above, approximately five nested well pairs will be installed on various properties including (see **Figure 3**):

- Two pairs of shallow and deep nested wells on the former Lindley Estate (a total of four wells) to monitor the shallow and deep aquifer zones behind EcoFlo facility.

- A nested shallow and deep well pair on the ATCO Rubber Products property located at 2806 Patterson Street to establish upgradient control.

- A nested shallow and deep well pair downgradient of the former Chem-Solv facility to evaluate potential COPC migration to the southwest.

- A shallow well on the former onto the property owned by Wayne McDonald Contractors located at 2751 Patterson Street, to monitor the shallow aquifer zone near existing monitor wells MW-22 (deep) and MW-22BR (bedrock).

These wells will be used to verify the findings of the supplemental investigations, complete assessment of off-site impacts and supplement the long-term groundwater monitoring network. Based on the findings from the supplemental investigations additional groundwater monitoring wells may also be proposed.

Other Potential Investigational Activities

The work proposed above likely can be completed during the 2011 calendar year. However, it will not be known with certainty whether the work will be sufficient to complete the required RFI investigations for the Site. ARCADIS will notify NCDENR should additional investigational activities be required.

Prepare RFI Report

Upon completion of the subsurface investigations discussed herein, ARCADIS will prepare a Phase III RFI Addendum Report for the Site, which will summarize all historical environmental data collected since initiation of environmental investigations in 1987.

Task 2. Assess Whether COPCs Concentrations Pose Potential Risks to Human and/or Ecological Exposure Points

Based on the results of an initial Site Conceptual Model (ESC 1999), the potential exposure pathways of greatest interest included:

- Direct contact with on-site soil containing target constituents;
- Inhalation exposure to target constituents migrating from soil and/or groundwater to indoor air (primarily on-site);
- Direct contact with target constituents in surface water and sediment in an off-site drainage ditch that extends east (off site) from the northeast corner of the facility, along the former railroad spur (near sample location MW-16); and
- Direct contact with target constituents in groundwater (primarily during construction activities) both on and off site.

These potential exposure pathways are being addressed as described below.

An Advanced Remedial Technologies (ART) system was installed at the Site in November 2006 by URS Corporation as an interim measure, and has operated almost continuously since that time. ARCADIS estimates that the ART system has removed approximately 800 pounds of VOCs over the course of operation since November 2006. This system was designed to address soil and shallow groundwater impacts and would thereby address potential direct contact with on-site soil constituents, as well as direct contact with constituents in the off-site drainage ditch. In addition, soil and shallow groundwater remediation would play a substantial role in addressing the potential groundwater exposure issues and would minimize future flux to deeper (bedrock) groundwater, limiting the potential scope and extent of bedrock groundwater remediation efforts, if necessary.

The VI Assessment conducted on the Johnston Properties parcel during September 2010 will enable ARCADIS to evaluate whether indoor air is being impacted by COPCs in soil and groundwater at the site. The data from this investigation is expected during October 2010, and will be available in the near future to assess whether abatement systems are required to address potential indoor air concerns on the Johnston Properties parcel.

Three additional soil-gas monitor points are planned along an unnamed tributary to S. Buffalo Creek. These points likely will be installed in October or November 2010. Therefore, the data from these investigations will also be available by the end of 2010. The source(s) of the total petroleum hydrocarbons; 1,4-dichlorobenzene, and PCE identified from the GoreTM Module soil gas survey is not currently known because multiple potential sources of these constituents exist in the area. Ashland and ARCADIS will keep NCDENR apprised of our planned work activities, and results from these investigations. At some point in the near future, it may be appropriate for NCDENR to investigate the potential for unknown release from one or more of the other potentially responsible parties identified above.

Habitat Assessment

During the week of September 10, 2010, ARCADIS performed a habitat assessment along the unnamed tributary to South Buffalo Creek to identify and document flora and fauna adjacent to and within the creek and potential beneficial uses of this resource. The purpose of this work was to identify potential exposure pathways for human and/or ecological receptors and the possible magnitude of any such exposures.

Focused Risk Assessment Report

On the basis of both historical and supplemental investigations discussed above, ARCADIS will complete a focused risk assessment. The results from this assessment will be used to evaluate the need for and select potential interim measures as presented in Task 3 (below). This focused risk assessment also will be used to during the Corrective Measure Study (CMS) development process (Task 4) to focus potential future remedial efforts, if required, on those constituents and media with the greatest risk to human health and/or the environment.

Task 3. Determine Whether Additional Interim Measures are Required to Reduce COPC Concentrations and Potential Risks Identified in Task 2

Accelerated Remediation Technologies (ART)

During late 2004 and early 2005, potential remedial options for impacted soil and shallow groundwater were evaluated for the facility, and as a result, the ART system was selected as an interim measure for the Site. In June 2005, six dual-phase groundwater recovery wells were installed in the source area on Ashland's former facility. Installation of the ART system was completed and started up in November

2006. The location of the six ART recovery wells (RW-1 through RW-6) are shown on **Figure 2**. The design and use of the ART technology was discussed in detail in previous reports. A brief summary of this system is discussed below for supplemental information for this remedial strategy document.

The ART system combines *in-situ* air stripping, air sparging, soil vapor extraction and enhanced bioremediation/oxidation, plus a dynamic subsurface circulation wellhead system. Vacuum pressure (the vapor extraction component) is applied atop of the well point to extract vapor from the subsurface. The negative pressure from vacuum extraction creates additional water mounding, boosts the net gradient back towards the well and removes vapors from the unsaturated zone and well annulus. Enhanced stripping via air sparging near the bottom of the well occurs simultaneously. In essence, each ART well acts as a subsurface air-stripping tower. .Although the ART system does not appear to have significantly reduced concentrations of COPCs in groundwater, the system is continuing to remove COPC mass from the subsurface and has removed approximately 800 pounds of VOCs since system start-up in November 2006.

Other Potential Interim Measures to be Evaluate for the Facility

The need for additional interim measures to stabilize, control, or abate potential risks to human health and the environment (OSWER Directive 9902.3-2A), will be evaluated upon completion of the planned subsurface investigations (Task 1) and the assessment of potential risks to human and/or ecological receptors points (Task 2). The overall purpose of the interim measures are to provide short- and moderate-term remedial strategies to initiate remedial actions sooner that would otherwise be afforded by implementing the longer corrective measure study approach. ARCADIS will provide data from the investigations proposed in Tasks 1 and 2 to NCDENR on at least a quarterly basis, including the potential use of interim measures at the site to control immediate risks to human health and the environment caused by Ashland's releases.

Task 4. Evaluate Applicable Corrective Measure Alternatives (CMAs) Capable of Reducing COPC in Soil and Groundwater

Upon completion of Tasks 1 and 2, ARCADIS will begin the process of evaluating other potential corrective measure alternatives (CMAs) for the Site. This Task will possibly begin concurrently with Task 3 – evaluation of whether additional interim measures are appropriate. However, if interim measures are required, then it is anticipated that the interim measure selection process would require less time than the CMS process. For remedy selection within the CMS, ARCADIS will utilize the provisions within RCRA Corrective Action Plan (OSWER Directive 9902.3-2A) to develop and evaluate corrective measures objectives and CMS performance criteria. As stated in the OSWER guidance, the CMS performance criteria establish the minimum conditions that the CMAs must satisfy to achieve the desired site-specific cleanup levels and are considered non-negotiable. Therefore, all CMAs that are considered must first meet the following performance standards in order to be evaluated in greater detail:

- Protect human health and the environment;
- Attain media cleanup standards;
- Control the source(s) of release so as to reduce or eliminate, to the extent practicable, further releases that may pose a risk to human health and the environment; and
- Comply with any applicable standards for management of wastes.

Correction Action Implementation (CMI) comes after the remedy selection process to be identified within the CMS, following the traditional RCRA Corrective Action process. Additional details regarding the CMI would be provided within the CMS and/or the subsequent CMI Work Plan to be prepared upon NCDENR acceptance of the CMS.

Schedule

The implementation schedule for evaluating and selecting an applicable remedy(ies) for the Site are provided in **Figure 4**, based on the information contained in previous sections of this report.

We look forward to your review and input regarding our proposed remedial strategy development process. Please feel free to contact me at (919) 854-1282, or Mike Dever at (614) 790-1586 if you have any questions regarding the information herein.

Sincerely,

ARCADIS

Donald R. Malone, PE
Principal Engineer/Sr. Project Manager

Attachments:

Figure 1 – Site Location and Other Potential Industrial Sources

Figure 2 – Site Layout.

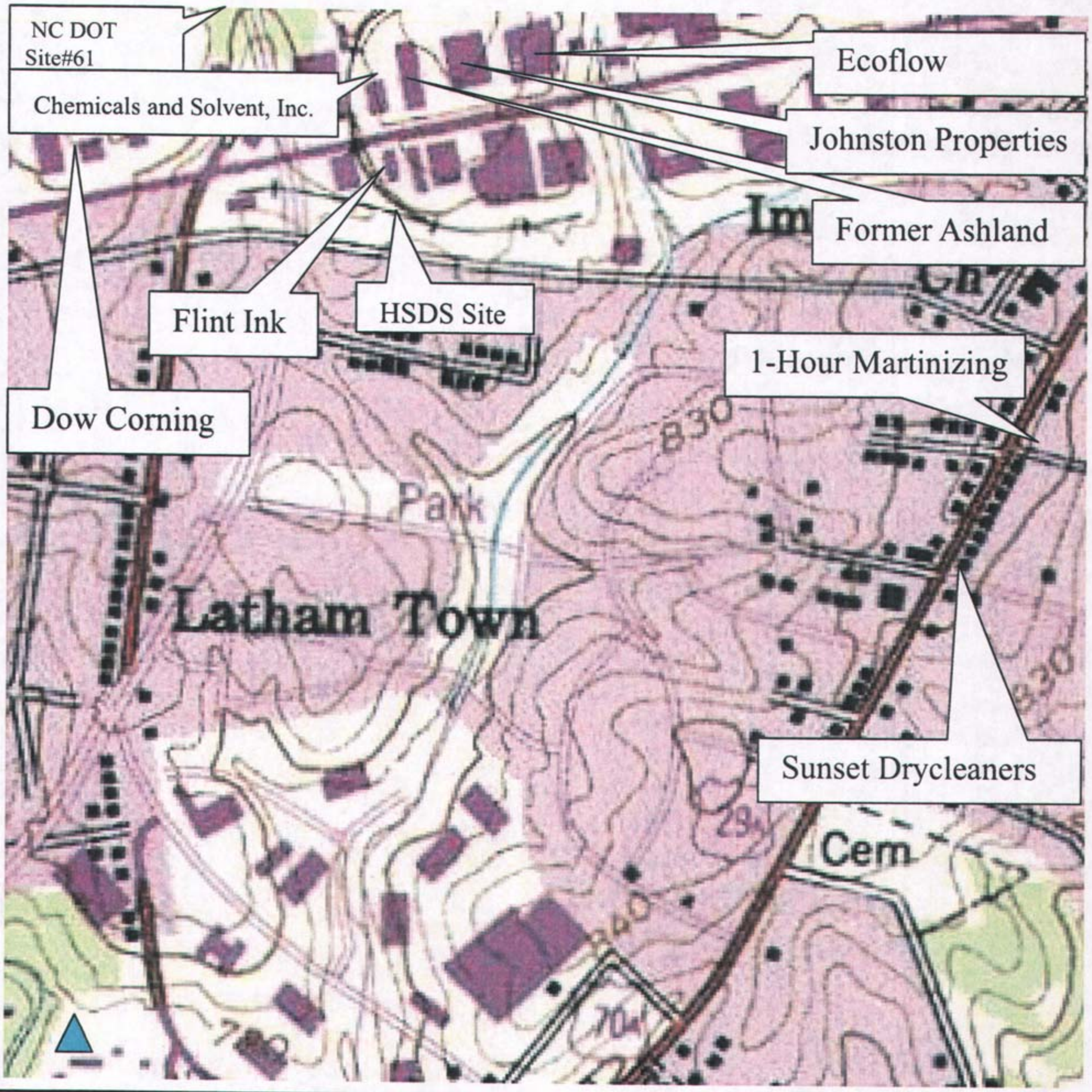
Figure 3 – Proposed Source Investigation

Figure 4 – Schedule for Refining the Site's Remedial Strategy.

Attachment A – Gore™ Module Survey

Copies:

Mike Dever – Ashland, Dublin, OH.



QUADRANGLE LOCATION

SCALE 1:12,000 CONTOUR INTERVAL 2 METERS

0 1000 2000

SCALE IN FEET

SOURCE: TOPOGRAPHY TAKEN FROM USGS 7.5 MINUTE QUADRANGLE GREENSBORO, NC MAPS

N

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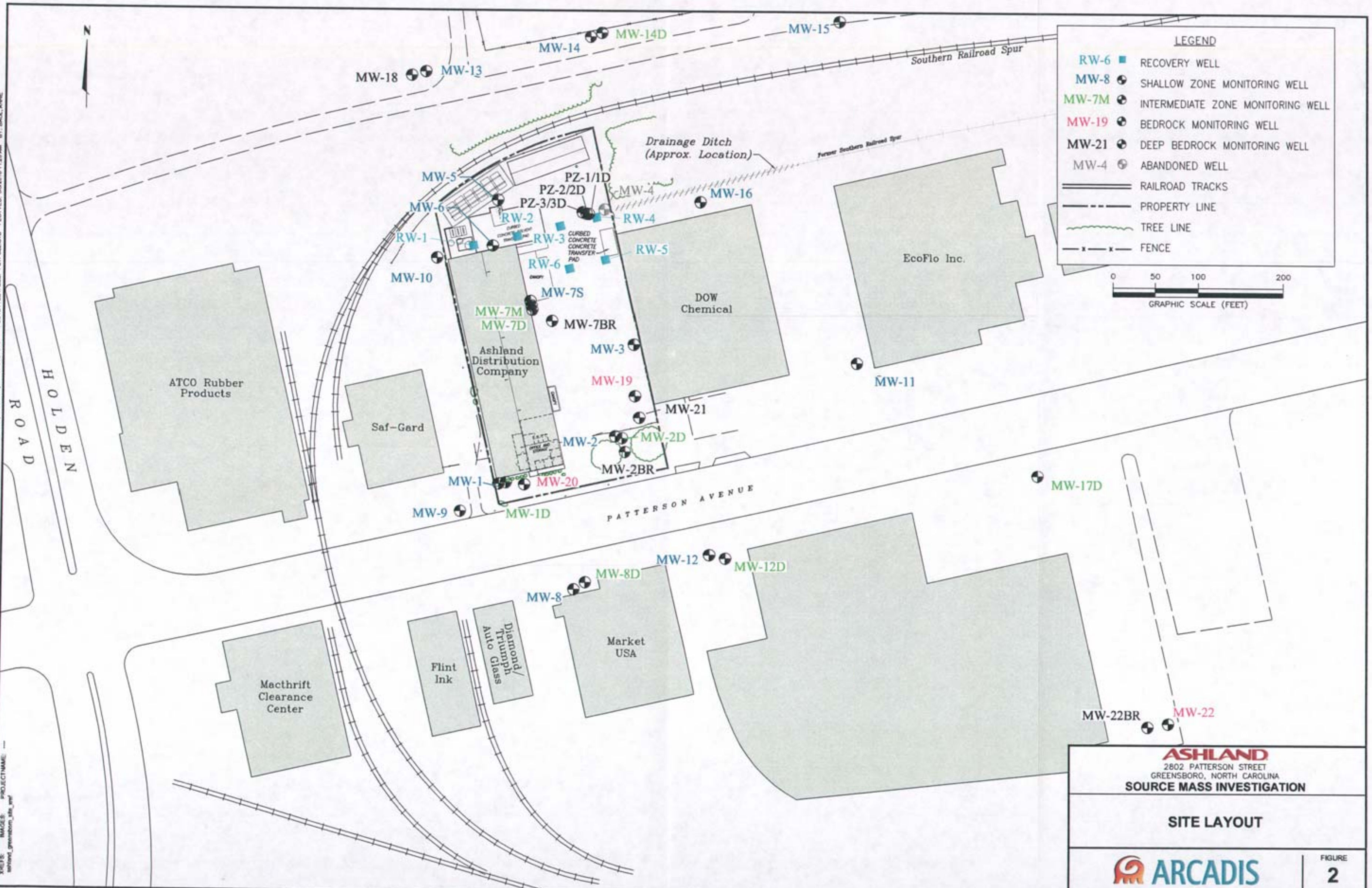
919-854-1282

REV.	DRAWING DATE: 9/20/2010	ACAD FILE:	
SITE LOCATION AND OTHER POTENTIAL INDUSTRIAL SOURCES			
CLIENT:	ASHLAND CHEMICAL		PM:
LOCATION:	GREENSBORO, NORTH CAROLINA		PE/RG:
DESIGNED:	DETAILED: DM	PROJECT NO: OH003000.NC03	FIGURE: 1



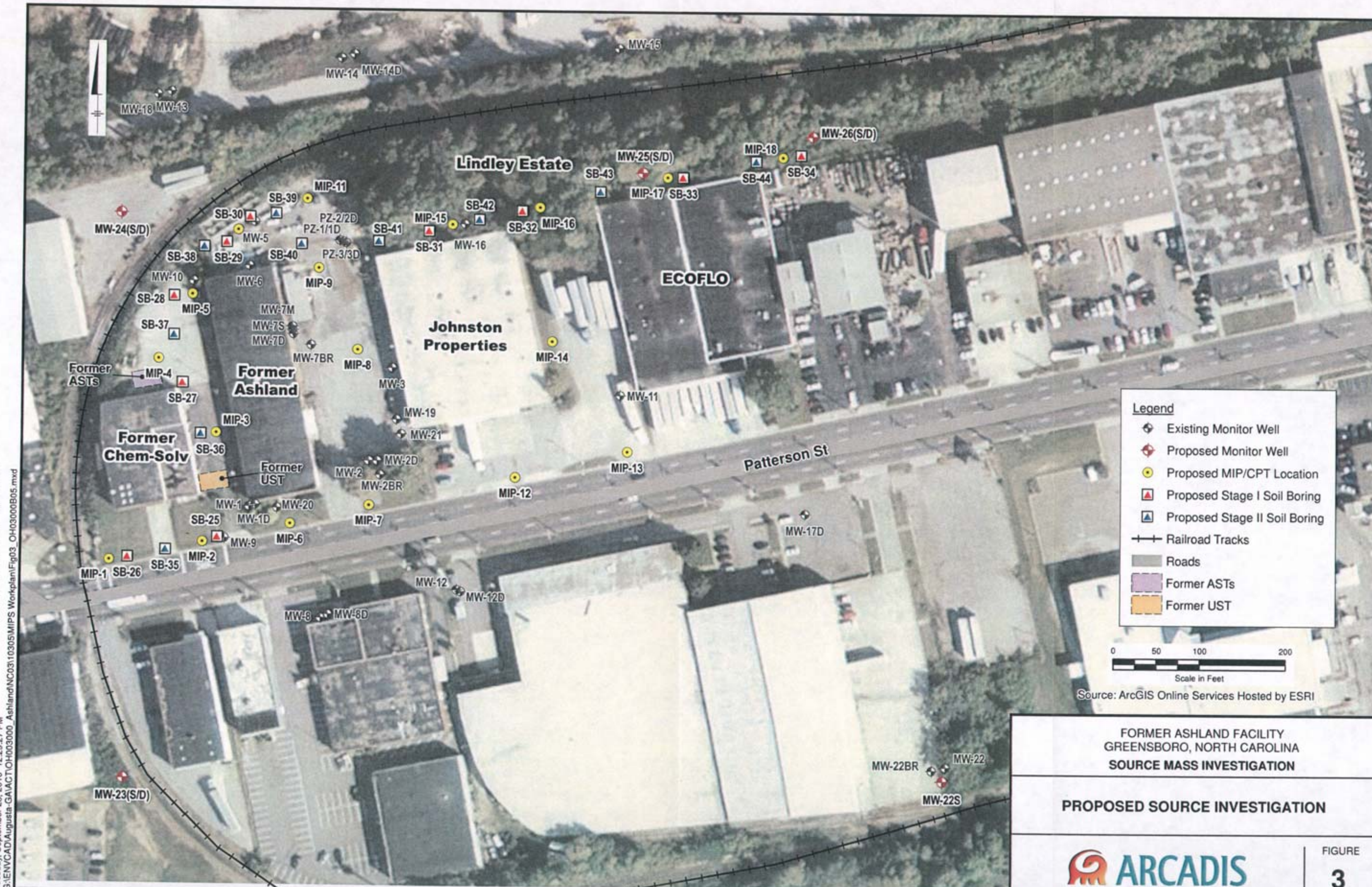
ASHLAND
2802 PATTERSON STREET
GREENSBORO, NORTH CAROLINA
SOURCE MASS INVESTIGATION

SITE LAYOUT

ARCADIS

FIGURE 2

CITY: Augusta, GA DIV/GROUP: ENV DB: A. Saul LD: PIC: PM: D. Malone TM: A. Tripp TR: R. Gerber
Tuesday, September 28, 2010 12:29:27 PM
G:\ENVCAD\Augusta-GA\ACT\OH003000_Ashland\NC03\10305\MIPS Workplan\Fig03_OH03000B05.mxd



Source: ArcGIS Online Services Hosted by ESRI

FORMER ASHLAND FACILITY
GREENSBORO, NORTH CAROLINA
SOURCE MASS INVESTIGATION

PROPOSED SOURCE INVESTIGATION

ARCADIS

FIGURE
3

Figure 4. Schedule for Refining the Site Remedial Strategy

Year	2010				2011								
Month	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept
Task 1. Investigate the Extent of Chemical Impacts to Environmental Media													
Soil-Gas Sampling/Evaluation Along Unnamed Stream													
VI Assessment - Johnston Properties Parcel													
Multi-Phase Source Investigation													
Installation of Additional Monitor Wells													
Compile Phase III RFI													
Task 2. Assess Potential Risks to Human and/or Ecological Exposure Points													
Stream Habitat Assessment													
Risk Assessment - Unnamed Stream													
Risk Assessment - VI at Johnston Properties													
Risk Assessment - Potential Sources Lindley Estate & Johnston Properties													
Task 3. Determine Whether Interim Measures (IMs) Are Required to Reduce COPC Concentrations and Potential Risks Identified in Task 2													
Evaluate IMs at Unnamed Creek													
Evaluate IMs for VI at Johnston Properties													
Evaluate IMs for Source Areas													
Task 4. Evaluate Applicable Corrective Measure Alternatives (CMAs) Capable of Reducing COPCs in Soil and Groundwater													
Develop Preliminary CMAs[1]													

Notes:

1 - Additional activities may be conducted prior to/during CMA development, including: Updating the Conceptual Site Model (CSM), groundwater fate and transport modeling, developing the Corrective Measures Study (CMS) Work Plan, developing the CMS report. The CMS report likely would be prepared in 2012; schedule to be determined.

Attachment A

GORE^{TM} Module Survey

GORE(TM) SURVEYS ANALYTICAL RESULTS
ARCADIS US INC., RELEIGH, NC
GORE CHLORINATED HYDROCARBONS (A10)
ESTIMATED SOIL GAS CONCENTRATION
ASHLAND, GREENSBORO, NC
SITE FOA - PRODUCTION ORDER #20665358

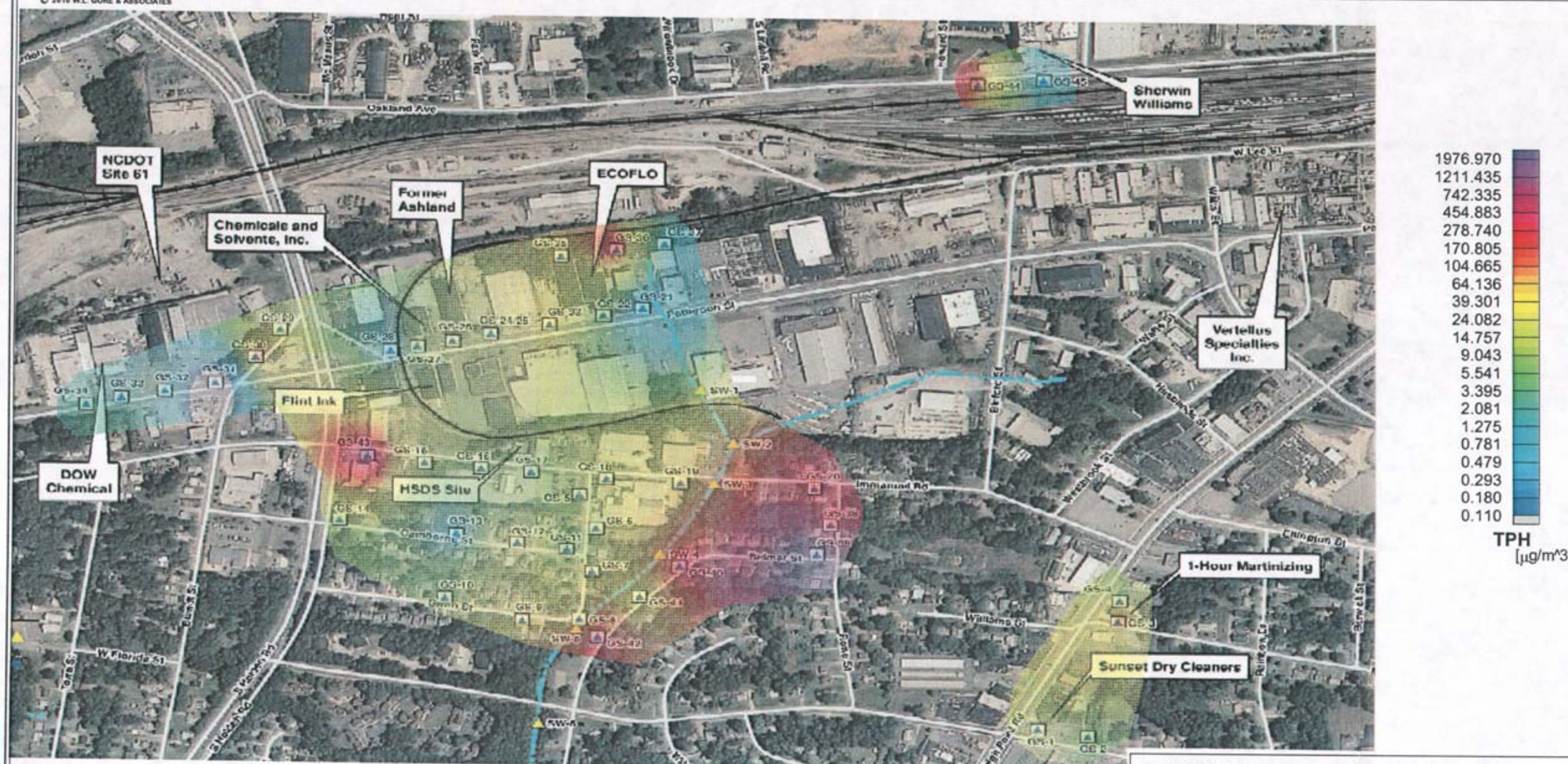
DATE ANALYZED	SAMPLE NAME	ID	TPH, ug/m^3	CIBENZ, ug/m^3	ct12DCE, ug/m^3	t12DCE, ug/m^3	c12DCE, ug/m^3	11DCA, ug/m^3	CHCl3, ug/m^3	111TCA, ug/m^3	12DCA, ug/m^3	TCE, ug/m^3	PCE, ug/m^3	14DCB, ug/m^3	CCl4, ug/m^3	112TCA, ug/m^3	1112TetCA, ug/m^3	1122TetCA, ug/m^3	13DCB, ug/m^3	12DCB, ug/m^3
	MDL=		0.61	0.60		9.56	3.43	3.22	2.16	3.88	1.29	1.05	0.73	0.51	3.71	0.71	0.96	0.64	0.52	0.52
8/26/10	637939	GS - 1	18.72	nd	nd	nd	nd	nd	nd	nd	nd	nd	49.32	nd	nd	nd	nd	nd	nd	nd
8/26/10	637940	GS - 2	6.94	nd	nd	nd	nd	nd	nd	nd	nd	nd	31.68	nd	nd	nd	nd	nd	nd	nd
8/26/10	637941	GS - 3	124.14	nd	nd	nd	nd	nd	nd	nd	nd	nd	5.97	nd	nd	nd	nd	nd	nd	nd
8/26/10	637942	GS - 4	7.89	nd	nd	nd	nd	nd	5.78	nd	nd	nd	1556.69	nd	nd	nd	nd	nd	nd	nd
8/25/10	637943	GS - 5	12.60	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
8/26/10	637944	GS -6	16.68	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
8/26/10	637945	GS - 7	33.98	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
8/25/10	637946	GS - 8	50.59	nd	nd	nd	nd	nd	nd	nd	nd	nd	5.11	nd	nd	nd	nd	nd	nd	nd
8/25/10	637947	GS - 9	56.32	nd	nd	nd	nd	nd	nd	nd	nd	nd	144.84	nd	nd	nd	nd	nd	nd	nd
8/25/10	637948	GS - 10	9.16	nd	nd	nd	nd	nd	nd	nd	nd	1.46	2.18	nd	nd	nd	nd	nd	nd	nd
8/26/10	637949	GS - 11	6.05	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
8/26/10	637950	GS - 12	25.09	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
8/26/10	637951	GS - 13	1.09	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
8/26/10	637952	GS - 14	8.68	nd	nd	nd	nd	nd	nd	nd	nd	bdl	14.60	nd	nd	nd	nd	nd	nd	nd
8/26/10	637953	GS - 15	12.62	nd	nd	nd	nd	nd	nd	nd	nd	2.38	1.36	nd	nd	nd	nd	nd	nd	nd
8/25/10	637954	GS - 16	9.59	nd	nd	nd	nd	nd	nd	nd	nd	bdl	3.80	nd	nd	nd	nd	nd	nd	nd
8/25/10	637955	GS - 17	6.09	nd	nd	nd	nd	nd	nd	nd	nd	bdl	nd	nd	nd	nd	nd	nd	nd	nd
8/26/10	637956	GS - 18	20.11	nd	nd	nd	nd	nd	nd	nd	nd	nd	22.28	nd	nd	nd	nd	nd	nd	nd
8/25/10	637957	GS - 19	52.28	nd	nd	nd	nd	nd	nd	nd	nd	nd	3.01	nd	nd	nd	nd	nd	nd	nd
8/25/10	637958	GS - 20	262.62	nd	bdl	nd	bdl	nd	nd	nd	nd	bdl	10.56	nd	nd	nd	nd	nd	nd	nd
8/26/10	637959	GS - 21	0.77	nd	nd	nd	nd	nd	5.16	nd	nd	nd	1.35	nd	nd	nd	nd	nd	nd	nd
8/26/10	637960	GS - 22	4.25	nd	nd	nd	nd	nd	nd	nd	nd	5.55	1427.15	nd	nd	nd	nd	nd	nd	nd
8/25/10	637961	GS - 23	49.82	nd	6.12	nd	6.12	nd	nd	nd	nd	588.62	>2078.27	nd	nd	nd	nd	nd	nd	0.67
8/26/10	637962	GS - 24	11.27	nd	51.63	bdl	51.63	34.30	10.72	nd	nd	2566.40	>2210.53	0.90	nd	4.17	nd	nd	nd	0.88
8/25/10	637963	GS - 25	15.00	nd	48.65	nd	48.65	35.12	11.17	nd	nd	2699.80	>2214.78	1.11	nd	4.32	nd	nd	nd	1.28
8/26/10	637964	GS - 26	12.85	nd	nd	nd	nd	16.81	8.71	11.22	nd	189.13	>1910.63	nd	nd	nd	nd	nd	nd	nd
8/26/10	637965	GS - 27	10.21	1.97	nd	nd	nd	nd	nd	nd	nd	nd	10.10	1.91	nd	nd	nd	nd	nd	nd
8/26/10	637966	GS - 28	0.85	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
8/25/10	637967	GS - 29	18.80	nd	nd	nd	nd	nd	nd	nd	nd	bdl	nd	nd	nd	nd	nd	nd	nd	nd
8/26/10	637968	GS - 30	96.90	nd	nd	nd	nd	nd	nd	nd	nd	nd	21.65	nd	nd	nd	nd	nd	nd	nd
8/26/10	637969	GS - 31	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
8/25/10	637970	GS - 32	2.84	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
8/26/10	637971	GS - 33	1.51	nd	nd	nd	nd	nd	nd	nd	nd	bdl	5.53	nd	nd	nd	nd	nd	nd	nd
8/25/10	637972	GS - 34	2.28	nd	nd	nd	nd	nd	nd	nd	nd	bdl	nd	nd	nd	nd	nd	nd	nd	nd
8/26/10	637973	GS - 35	38.40	nd	nd	nd	nd	nd	nd	nd	nd	nd	544.02	nd	nd	nd	nd	nd	nd	nd
8/26/10	637974	GS - 36	363.79	nd	nd	nd	nd	nd	nd	nd	nd	nd	73.21	nd	nd	nd	nd	nd	nd	nd
8/26/10	637975	GS - 37	1.41	nd	nd	nd	nd	nd	nd	nd	nd	9.49	nd	nd	nd	nd	nd	nd	nd	nd
8/26/10	637976	GS - 38	267.62	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	7.96	nd	nd	nd	nd	1.31	1.16
8/25/10	637977	GS - 39	>1976.54	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	46.47	nd	nd	nd	nd	7.80	6.60
8/26/10	637978	GS - 40	302.54	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	39.58	nd	nd	nd	nd	6.69	5.33
8/26/10	637979	GS - 41	29.10	nd	nd	nd	nd	nd	nd	nd	nd	nd	1.13	3.87	nd	nd	nd	nd	0.70	0.55
8/25/10	637980	GS - 42	311.91	nd	nd	nd	nd	nd	nd	16.94	nd	bdl	129.10	10.79	nd	nd	nd	nd	2.05	1.61
8/26/10	637981	GS - 43	721.37	nd	nd	nd	nd	nd	nd	nd	nd	nd	148.72	22.70	nd	nd	nd	nd	4.00	3.59
8/26/10	637982	GS - 44	233.17	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	7.80	nd	nd	nd	nd	1.26	0.80
8/26/10	637983	GS - 45	0.67	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.88	nd	nd	nd	nd	nd	nd
8/25/10	method blank		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
8/26/10	method blank		bdl	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
	Maximum		1976.54	1.97	51.63	2.72	51.63	35.12	11.17	16.94	0.00	2699.80	2214.78	46.47	0.00	4.32	0.00	0.00	7.80	6.60
	Standard Dev.		315.56	0.29	10.47	0.41	10.46	7.58	2.77	3.00	0.00	552.67	657.89	9.59	0.00	0.89	0.00	0.00	1.63	1.36
	Mean		115.89	0.04	2.36	0.06	2.42	1.92	0.92	0.63	0.00	134.82	280.61	3.20	0.00	0.19	0.00	0.00	0.53	0.50

No mdl is available for summed combinations of analytes. In summed columns (eg., BTEX), the reported values should be considered ESTIMATED if any of the individual compounds were reported as bdl.

GORE™ Surveys - Final Report

KEY TO DATA TABLE

UNITS	
µg	micrograms, relative mass value
µg/m^3	micrograms per cubic meter; estimated soil gas concentration
MDL	method detection limit
bdl	below detection limit; compound was observed at level below the MDL
nd	non-detect, compound was not detected at any level
>	greater than; value considered estimated due to high mass levels
ANALYTES	
TPH	total petroleum hydrocarbons
ClBENZ	chlorobenzene
ct12DCE	cis- & trans-1,2-dichloroethene
t12DCE	trans-1,2-dichloroethene
c12DCE	cis-1,2-dichloroethene
11DCA	1,1-dichloroethane
111TCA	1,1,1-trichloroethane
12DCA	1,2-dichloroethane
TCE	trichloroethene
PCE	tetrachloroethene
14DCB	1,4-dichlorobenzene
$CHCl_3$	chloroform
CCl_4	carbon tetrachloride
112TCA	1,1,2-trichloroethane
1112TetCA	1,1,1,2-tetrachloroethane
1122TetCA	1,1,2,2-tetrachloroethane
13DCB	1,3-dichlorobenzene
12DCB	1,2-dichlorobenzene
BLANKS	
method blank	QA/QC module, documents analytical conditions during analysis



Scale 1:8400

500 0 500 1000 1500

(feet)

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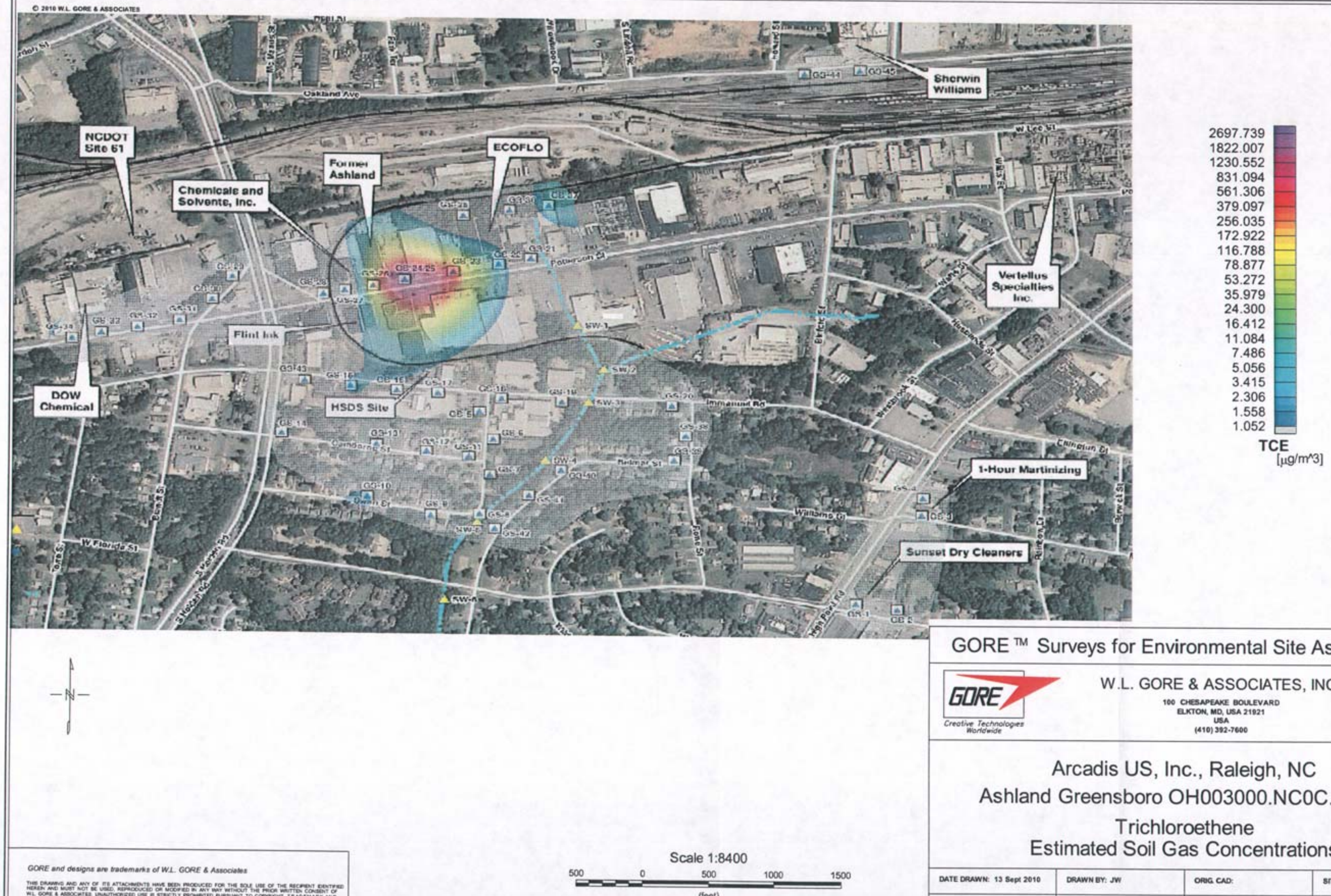
Arcadis US, Inc., Raleigh, NC

Ashland Greensboro OH003000.NC0C.10306

Total Petroleum Hydrocarbons
Estimated Soil Gas Concentrations

DATE DRAWN: 13 Sept 2010	DRAWN BY: JW	ORIG. CAD:	SITE CODE: FOH
REV. DATE:	REV. #:	PROJECT NUMBER: 20665358	



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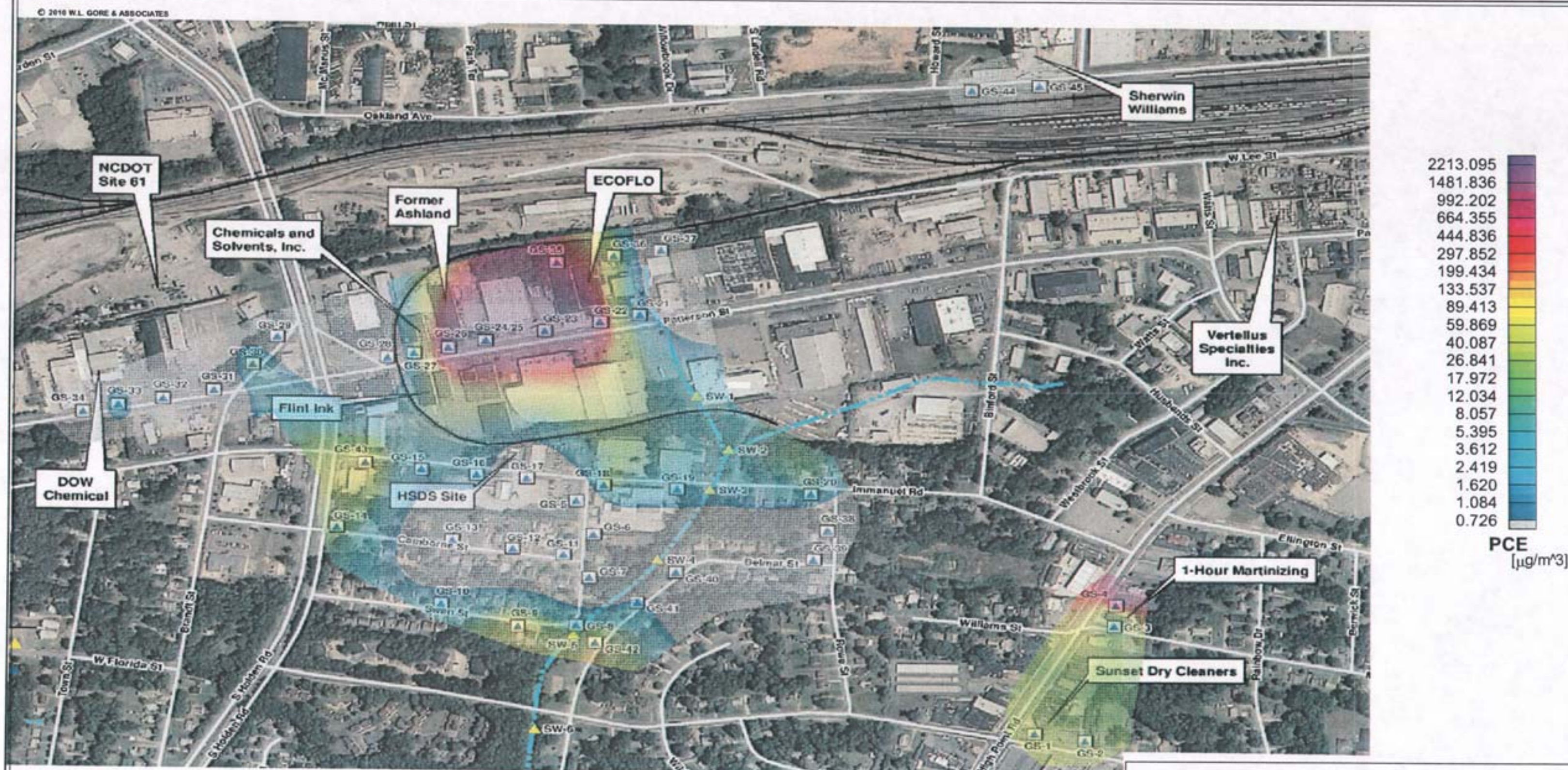
Trichloroethene
Estimated Soil Gas Concentrations

DATE DRAWN: 13 Sept 2010	DRAWN BY: JW	ORIG. CAD:	SITE CODE: FOH
REV. DATE:	REV. #:	PROJECT NUMBER: 20665358	



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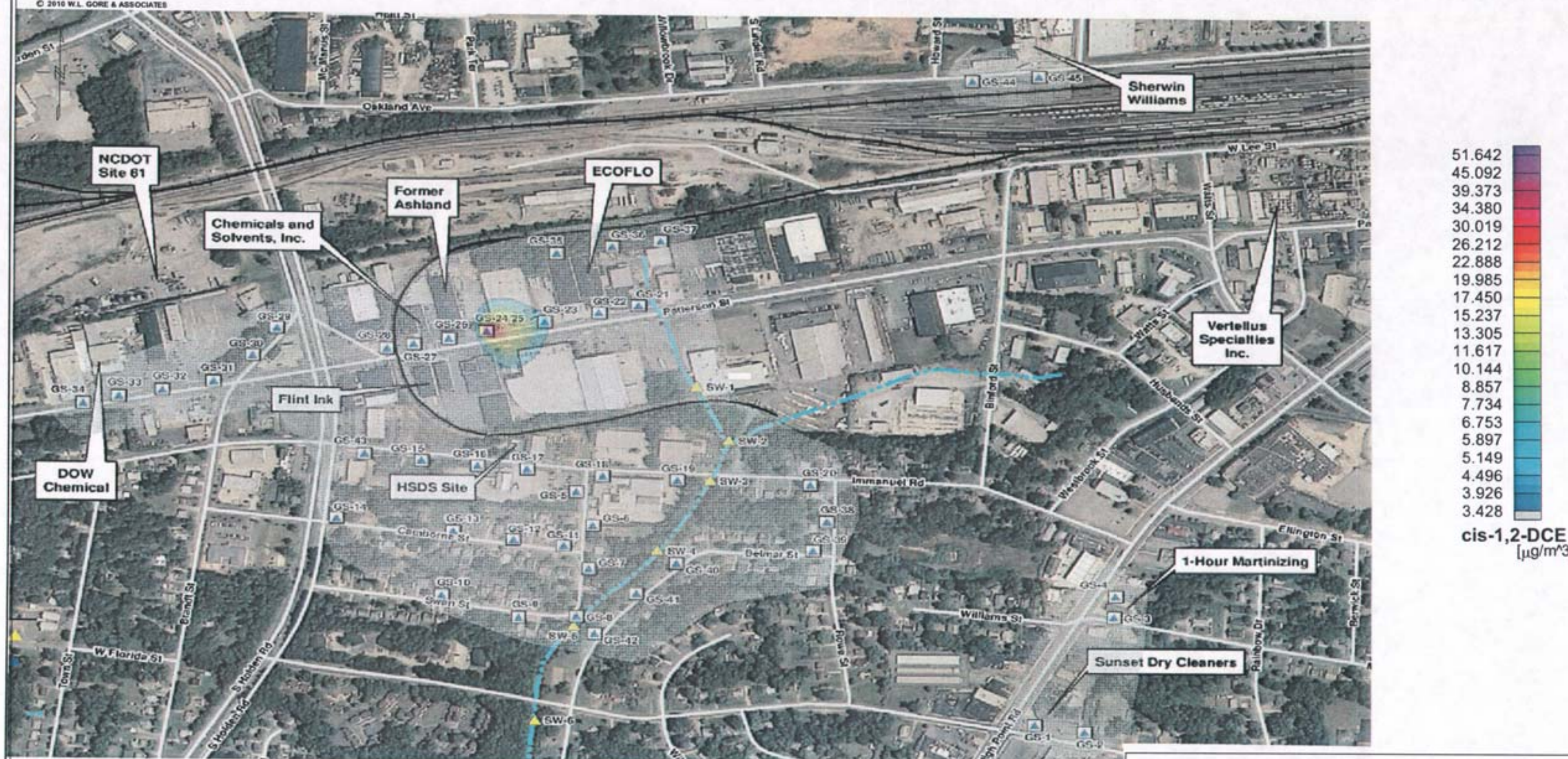
Tetrachloroethene
Estimated Soil Gas Concentrations

DATE DRAWN: 13 Sept 2010	DRAWN BY: JW	ORIG. CAD:	SITE CODE: FOH
REV. DATE:	REV. #:	PROJECT NUMBER: 20665358	



Scale 1:8400

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(feet)

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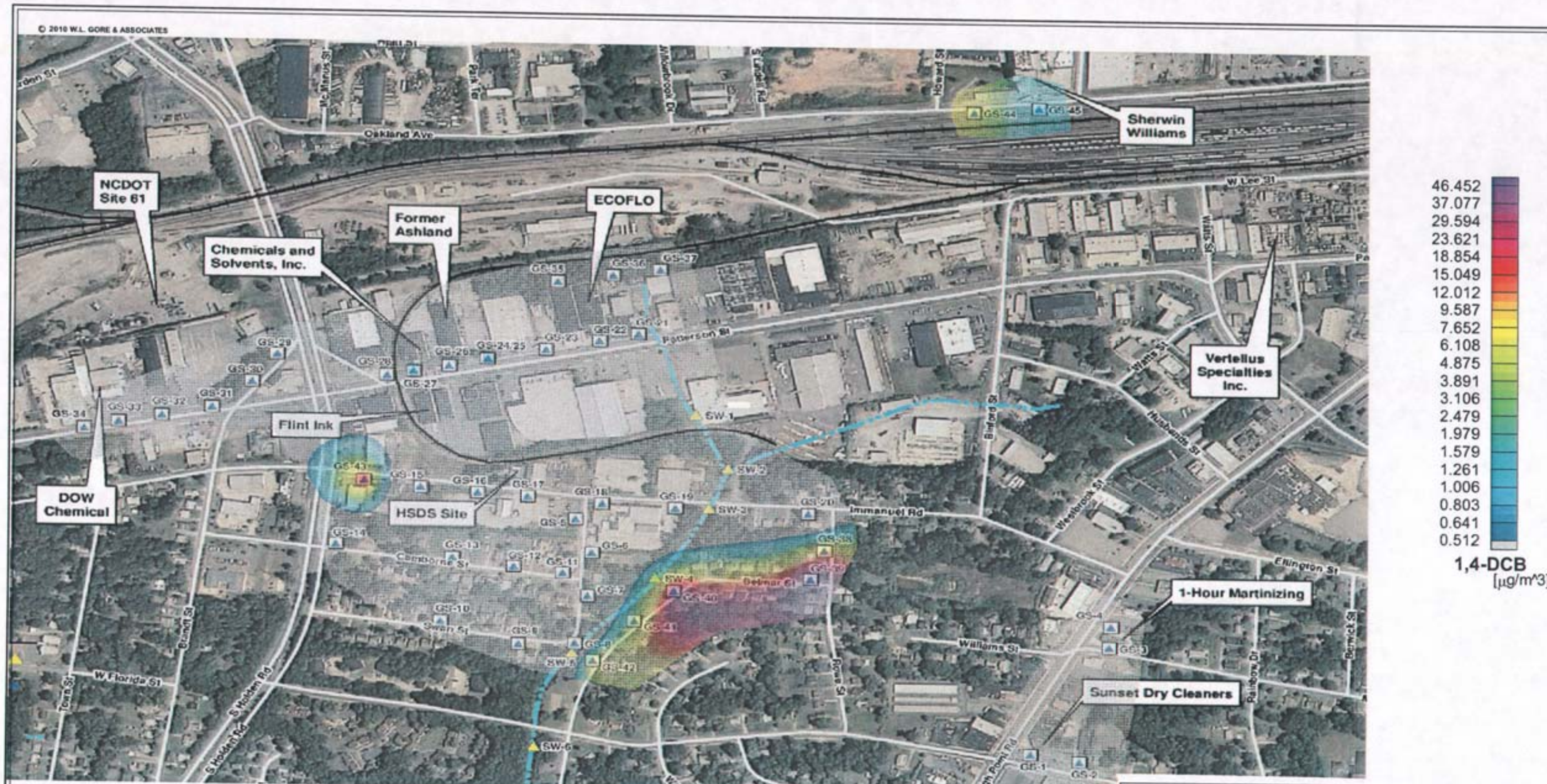
cis-1,2-Dichloroethene

DATE DRAWN: 13 Sept 2010	DRAWN BY: JW	ORIG. CAD:	SITE CODE: FOH
REV. DATE:	REV. #:	PROJECT NUMBER: 20665358	



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Scale 1:8400

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(feet)

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1,4-Dichlorobenzene
Estimated Soil Gas Concentrations

DATE DRAWN: 13 Sept 2010	DRAWN BY: JW	ORIG. CAD:	SITE CODE: FOH
REV. DATE:	REV. #:	PROJECT NUMBER: 20665358	